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FIG. 5 is a view of the hidden hinge shown in FIG. 4 taken from a different angle;

FIG. 6 is an illustration showing an exemplary case wherein the hidden hinge shown in FIG. 3 is mounted in a notebook type personal computer;

FIG. 7 is an illustration showing an open state of the notebook type personal computer shown in FIG. 6;

FIG. 8 is a view of the notebook type personal computer shown in FIG. 7 taken from a different angle;

FIG. 9 is an illustration showing another exemplary case wherein the hidden hinge shown in FIG. 3 is mounted in a notebook type personal computer;

FIG. 10 is an illustration showing an open state of the notebook type personal computer shown in FIG. 9; and

FIG. 11 is a view of the notebook type personal computer shown in FIG. 10 taken from a different angle.

DETAILED DESCRIPTION

An embodiment of the present disclosure will now be described with reference to the drawings.

First, a hidden hinge according to the related art will be described.

FIG. 1 is an illustration of a hidden hinge 10 according to the related art which is presented by way of example. As shown in the figure, the hidden hinge 10 includes a mounting plate 21 and a mounting plate 22. For example, the mounting plates 21 and 22 are attached to a first housing and a second housing of an apparatus, respectively.

The first housing may be the body of a display of a notebook type personal computer which can be carried in a lapped state, and the second housing may be the main body of the notebook type personal computer.

The hidden hinge 10 includes arms 23 and 24, and the arms 23 and 24 are connected by a pin 31. For example, an imaginary line extending through the center of the pin 31 perpendicularly to the plane of the drawing constitutes a rotational axis of the display of the notebook type personal computer (or main body of the personal computer).

An end 23a of the arm 23 is engaged with a hole 21a of the mounting plate 21 and slid the hole 21a in the engaged state substantially in the horizontal direction of the drawing (in a slightly oblique direction). Similarly, an end 24a of the arm 24 is engaged with a hole 22a of the mounting plate 22 and slid in the hole 22a in the engaged state substantially in the horizontal direction of the drawing (in a slightly oblique direction).

Another end of the arm 23 is connected with the mounting plate 22 by a pin 33. Similarly, another end of the arm 24 is connected with the mounting plate 21 by a pin 32.

The parts of the hidden hinge 10 connected with pins are rotatable about the pins serving as axes.

In a case wherein the hidden hinge 10 is mounted in a notebook type personal computer, the notebook type personal computer is in a lapped state (or a closed state) when the hinge is in the state shown in FIG. 1.

FIG. 2 is an illustration of the hidden hinge 10 in an open state of the notebook type personal computer in the case wherein the hidden hinge 10 is mounted in the notebook type personal computer. For example, when a user raises the display of the notebook type personal computer, the end 23a of the arm 23 slides in the hole 21a, and the end 24a of the arm 24 slides in the hole 22a. Thus, the display is rotated about the rotational axis of the pin 31.

Each of the arms 23 and 24 has a curved shape to allow the notebook type personal computer to be opened and closed.

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With the hidden hinge 10 mounted as thus described, the hidden hinge 10 can be kept invisible for a user when the notebook type personal computer is opened to expose the display.

As described above, the hidden hinge according to the related art as shown in FIG. 1 employs a slide mechanism. It is difficult to provide the hidden hinge having a slide mechanism with a small size because the strength of the mounting plate 21 or mounting plate 22 must be sufficiently kept in the region thereof having the hole 21a or 22a in which the end 23a or 24a of the respective arm of the hinge is slid.

For example, let us assume that the length of the mounting plate 21 in the vertical direction of FIG. 1 is reduced from the illustrated length. Then, the mounting plate 21 may be broken when the end 23a of the arm 23 slides in the hole 21a in engagement therewith substantially in the horizontal direction of the figure (in a lightly oblique direction).

For example, the mounting plate 21 is attached to a display of a notebook type personal computer. The thickness of the notebook type personal computer cannot be smaller than the length of the mounting plate 21 in the vertical direction of FIG. 1.

Since the slide mechanism is designed such that the hinge is slid with the end thereof engaged with the hole of the mounting plate, there is concern about wear of the mechanism attributable to friction, and the mechanism must therefore be designed for sufficient durability. In order to achieve sufficient durability, materials usable for the mechanism are limited.

As thus described, the use of hidden hinges according to the related art has hindered efforts toward apparatus having a smaller thickness and a lighter weight in some cases.

Under the circumstance, an embodiment of the present disclosure makes it possible to provide a hidden hinge different from hidden hinges according to the related art. Specifically, a hidden hinge can be provided such that an apparatus employing the hinge can be made thin and lightweight with the durability of the hinge kept sufficiently high.

FIG. 3 is an illustration of a hidden hinge 50 according to an embodiment of the present disclosure. As shown in the figure, the hidden hinge 50 includes a mounting plate 51, and a mounting plate 52. For example, the mounting plates 51 and 52 are attached to a first housing and a second housing of an apparatus, respectively.

Instead of providing the mounting plates 51 and 52, an arm 53, an arm 54, a link 71, and a link 72 may be directly mounted on the first and second housings, respectively.

The first housing may be the body of a display of a notebook type personal computer which can be carried in a lapped state, and the second housing may be the main body of the notebook type personal computer.

The hidden hinge 50 includes the arms 53 and 54, and the arms 53 and 54 are connected by a pin 61. For example, an imaginary line extending through the center of the pin 61 perpendicularly to the plane of the figure constitutes a rotational axis of the display of the notebook type personal computer (or the main body of the computer).

Each of the arms 53 and 54 has a curved shape to allow the notebook type personal computer to be opened and closed. The arm 53 of this embodiment is curved at corners 53a and 53b. The arm 54 of this embodiment is curved at corners 54a and 54b.

Further, the hidden hinge 50 includes the links 71 and 72. The links 71 and 72 have a straight shape unlike the arms 53 and 54.

One end of the arm 53 is connected to the mounting plate 52 by a pin 63. Another end of the arm 53 is connected to the